Ref # 17

370

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Forest Insect Laboratory
Coeur d'Alene, Idaho

Henry J. Rust

Project

Date December 1, 1942

Author Senior Scientific Aide

TITLE

INSECT-REARING EXPERIMENTS FOREST INSECT LABORATORY COEUR D'ALENE, IDAHO

SUBJECT—

INDEX NO.—

U.S. GOVERNMENT PRINTING OFFICE 8—9743

File No. _____

Noted by RLF

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Forest Insect Laboratory
Coeur d'Alene, Idaho

January 5, 1943

To: R. L. Furniss, Acting in Charge, Portland Laboratory

From: James C. Evenden in Charge, Coeur d'Alene Laboratory

Subject: Melanophila californica and Melanophila gentilis

May I thank you for your comments concerning Mr. Rust's report covering the insect-rearing experiments for the season 1942. As Mr. Rust is absent from the laboratory because of illness and may be absent for some weeks, I am attempting to answer your questions.

You ask whether the Melanophila that emerged from slash in 1941 might have developed from incipient larvae present in the green trees at the time they were felled for slash. This is a possibility of course and is one that we can not answer. To guard against this possibility we should have obtained the slash in areas where there was no Melanophila infestation. I am sorry that we did not foresee this possibility at the time the experiment was started.

I have no comments to make relative to the lack of larval parasites in Melanophila californica except to say that Mr. Rust is a very careful workman and I am sure that had they occurred in our rearings they would have been observed and collected. So it would seem, as you state, that they are not very numerous.

I am sorry that Mr. Rust is unable to answer your letter personally, which I am sure he would have appreciated doing.

Copies of this letter have been sent to Dr. Craighead and to Mr. Keen.

James C. Evenden

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Forest Insect Laboratory
445 U. S. Court House
Portland, Oregon
December 28, 1942

To: J. C. Evenden, in Charge, Coeur d'Alene Laboratory

From: R. L. Furniss, Acting in Charge, Portland Laboratory

Subject: Rust's report "Insect-rearing Experiments, Forest Insect Laboratory, Coeur d'Alene, Idaho, 1942.

I have read with much interest the several reports on Melanophila californica and M. gentilis that have been issued by the Coeur d'Alene and California stations. Results of Mr. Rust's rearings in 1941 were especially provocative. It is most unfortunate that in 1942 he encountered conditions so adverse that no Melanophila emerged.

One question that came to mind regarding the 1941 rearings was whether the Melanophila californica that emerged from slash might have developed from incipient larvae present in the green tree at time of felling. In fact Mr. Rust does not seem to have mentioned whether any of the Riggins material contained the incipient larval stage that was found so generally in ponderosa pine in northeastern California by Salman and West.

A minor point, though none the less interesting, is the apparent lack of larval parasites on Melanophila californica. It seems improbable that there is actually none, but the number of species can hardly be numerous in view of all the rearings, at Coeur d'Alene and elsewhere, that have been negative to date.

File No. Mr. Furniss
Noted by
RLF
JMW
WJB

Forest Insect Laboratory
Coeur d'Alene, Idaho

December 9, 1942

To: F. C. Craighead, in Charge, Forest Insect Investigations

From: James C. Evenden, in Charge, Coeur d'Alene Laboratory

Subject: Insect-rearing Experiments, Forest Insect Laboratory, Coeur d'Alene, Idaho, 1942

I am enclosing a copy of Mr. Rust's report covering the work he has conducted at the Coeur d'Alene Insectary during the past season. You will note that most of this work was devoted to the rearing of Melanophila, although a number of other records were obtained.

I am sure Mr. Rust would be pleased to have your comments and criticisms relative to the substance of this report.

Copies of this letter and the report are being sent to the Berkeley, Portland, Fort Collins, and New Haven laboratories.

James C. Evenden

Enclosure

INSECT-REARING EXPERIMENTS
FOREST INSECT LABORATORY
COEUR D'ALENE, IDAHO

The following report covers the insect-rearing operations at the Coeur d'Alene Laboratory insectary from January 1 to December 31, 1942:

A large percentage of the rearings at the insectary during the past four years has been devoted to securing information on the biology of two species of Buprestidae, Melanophila californica Van Dyke, and Melanophila gentilis Lec., for the northern Rocky Mountain region. A brief tabulated summary of the results obtained is included, as well as an appended list of all the insects reared in association with the two Melanophila species. The 1942 rearing activities were a continuation of the 1941 Melanophila project, which was primarily concerned with securing information on the following four points: (1) to determine the length of time required for development from attack to emergence, (2) if both species of Melanophila would attack and develop broods in slash, (3) if the type of host material exerted any influence on the development of the external characters of the two species and (4) if Melanophila californica would attack slash under caged conditions and the brood reach maturity. Four special outdoor cages were constructed during 1941 to take care of this experiment in addition to the rearing equipment in the insectary. The first three points of the 1941 project were answered by the results secured from the rearings during the 1941 season. The answer to the fourth point was partly solved during 1941 from the fact that a number of attacks by Melanophila californica were secured on slash confined in cages and young larvae of this species were collected from the attacked material during October 1941. The overwintering of eight four-foot sections of this attacked ponderosa pine, with a possible emergence of Melanophila adults during June or July 1942 to complete the information required on point 4, constituted the principal rearing activity for the 1942 season. During the October 1941 examination of the ponderosa pine sections that had been placed in the outdoor cages at irregular intervals from May until July, it was found that a fungus mycelium believed to be Polyporus volvatus was developing on the cambium layer on all of the material examined. This fungus is a very common and fast-growing species attacking slash and dying standing ponderosa pine as well as other species of conifers in this region, and any material confined in cages is subject to an increased development of this species. All of the freshly cut sections that had been placed in the outdoor cages during the season of 1941 were removed to the insectary during October and placed in well-ventilated cages for overwintering 1941-42. Fruiting bodies of P. volvatus had formed on the outer bark surface of several of the caged sections before May 1, 1942, making the outlook for development of any Melanophila larvae very doubtful. While no severe cold weather was recorded for the winter months of 1941-42, the

months of April, May and June 1942 turned out very unfavorable for any rearing experiment. Only nine clear days were recorded for April, four for May, and six for June. Both May and June were far above normal in amount of rainfall and considerably below normal in air temperatures. This condition not only retarded insect development but was unusually favorable for the development of fungi growth. The six rearing cages containing the overwintered sections of ponderosa pine were examined regularly during May, June, July and August 1942 for any possible emergence of either M. californica or gentilis. No emergence of Melanophila was secured from this material. During the latter part of September 1942 an examination was made of the caged logs. Those sections that were found to contain small larvae at the time of examination in September and October 1941 were the first to be examined in 1942. One of these sections showed eight long Melanophila californica larval mines between the bark and wood, and another section five short larval mines. The cambium layer on both these sections was completely enveloped with a thick mat of Polyporus volvatus mycelium, with much of it penetrating the outer bark. One small dead M. californica measuring 5 mm. was located just inside the inner bark surface, this being the only larva found in any of the caged sections.

The only emergence secured from the caged material was one adult Pissodes schwarzi Hopk. that developed from a log that had been placed in outdoor cage (M.a.) which contained a large section of infested ponderosa pine that had been transported from the Riggins, Idaho, area. This was the only outdoor cage in which infested material was used. A few live adults of a Bostrichus sp., which is fairly common in ponderosa pine, were collected from under the bark at the extreme outer edge of the same section from which the Pissodes adult emerged.

SUMMARY OF THE MELANOPHILA PROJECT

During an examination of the ponderosa pine in the Salmon River region near Riggins, Idaho, in 1938, Mr. T. T. Terrell of the Coeur d'Alene Laboratory personnel found that a very heavy loss had occurred in some of the young stands. The dead and dying trees showed attacks by a species of flathead woodborer. At this time infested material cut from standing trees was brought to the Coeur d'Alene Laboratory insectary and a start was made to work out the biology of the species responsible for the death of the trees. This work was carried on during the succeeding four years. A tabulation of the results obtained is given in the following table.

LIST OF INSECTS REARED IN ASSOCIATION WITH
MELANOPHILA CALIFORNICA AND M. GENTILIS IN PONDEROSA
PINE FROM THE SALMON RIVER REGION NEAR RIGGINS, IDAHO
COEUR D'ALENE, IDAHO, LABORATORY INSECTARY 1940-42 INCLUSIVE

Coleoptera

Orthotomicus ornatus Sw.	Averaged as many as 67 adults per square foot of bark surface. From standing infested trees. Emergence during May 1940.
Pityophthorus burkei Blkm.	Emerged from the larger limbs cut from the same tree from which O. ornatus was secured. Emergence during May 1940.
Monochamus maculosus Hald.	Twenty-three adults reared from three small sections of ponderosa pine cut from the trap trees that were limbed and covered with brush, Riggins area, May 10, 1940. Emergence, July 1941.
Acanthocinus obliquus Lec.	Nine adults reared from same material from which M. maculosus was secured. Emergence June and July 1941.
Gelus californicus Lec.	Twenty-six adults reared from same material from which M. maculosus was secured. Emergence in July 1941.
Hypophloeus sp. near substriatus Lec.	Reared from same material from which M. maculosus emerged. Emergence during July 1941.
Othynius lugubris? Horn.	Reared from sections cut from infested standing trees. Emergence during July 1941.
Temnochila virescens var. chlorida (Mann.)	Reared from 11 of 27 infested sections. Emergence period of 90 days, May to September 1941.
Callidium antennatum Newm.	Reared from limbs cut from felled trees, Riggins area, May 16, 1940. Emergence May and June 1941.
Chrysobothris dolata Horn.	Reared from small limbs cut from felled trees Riggins area, May 16, 1940, and from infested sections. Emergence during July and August 1941.

Platydema sp.	Reared from only one section cut from standing tree. Emergence during May 1941.
Pissodes schwarzi Hopk.	Reared from a section of ponderosa pine placed in outdoor rearing cage to induce attacks by Melanophila sp. An infested section from the Riggins area was also in this cage and attacking adult Pissodes must have emerged from this material. Emergence July 1942.
Bostrichus sp.	Adults were collected from under bark at extreme end of section placed in cage from which Pissodes schwarzi was secured.

Hymenoptera

Atanycolus montivagus (Cress.)	Reared from sections cut from standing trees cut during February and May 1941.
Coeloides sp. near scolyti Cush.	Reared from section cut from trap tree cut May 16, 1940, on the Riggins area.
Ibalia ensiger Norton	38 adults of this species were reared from sections cut from standing trees. Emergence during August and September 1940. Probably parasitic on Sirex behrensi.
Sirex behrensi	102 adults of this species were reared from sections cut from standing trees. Emergence during August and September 1940.

Diptera

Zabrachia polita Coq.	Reared from section cut from felled tree May 1940. 34 adults emerged during July 1941.
Pseudatrichia prob. n. sp.	Reared from same section as Zabrachia polita. Emergence of 1 adult in July 1941.
Andrenosoma fulvicauda (Say.)	One adult reared from the same section as Zabrachia polita. Emergence in July 1941.

Hemiptera

Aradus n. sp.	Reared from section cut from standing tree cut during May 1941.

A TABULATED SUMMARY OF THE FIELD AND LABORATORY WORK CONDUCTED FROM 1938 TO 1942 INCLUSIVE TO SECURE DATA ON THE BIOLOGY OF *M. CALIFORNICA* AND *M. GENTILIS*

	Field treatment	Insectary treatment	Emergence record
1938 Standing infested ponderosa pine. Riggins, Ida., area	Seven three-foot sections cut 11/20/38. Brought to Coeur d'Alene, Ida.	Seven sections of infested logs placed in rearing cages #1, 2, & 3, 11/21/38. Overwintered 1938-39.	No emergence for 1938.
1939	No field work.	No additional infested material brought to insectary	Emergence record of 1938-39 overwintered material: Cage No. / Adults emerging / Number per square foot bark surface 1 — 50 — 5.26 2 — 11 — 1.57 3 — 60 — 8.57 121 — Average 5.14 from 23½ square feet bark surface All emergence consisted of *M. californica* adults. No associated insects.
1940 Green, uninfested trees, Riggins, Ida., area	Two felled 5/16/40 and left intact on ground for trap trees.	Three sections brought to insectary 7/26/40. One section each in Cages #1 & 3 and Can #4.	Emergence record July 31, 1940, to August 19, 1940. 8 adult *Melanophila gentilis* emerged from Cage #3.
	Two felled 5/16/40, limbed, topped, and bole covered with brush. One felled 8/15/40 and left intact on ground.	Four sections brought to insectary 7/26/40. Three sections in Cage #2, one section in Cage #4. Two sections brought to insectary 10/15/40. Placed in cage #5.	
Standing inf. trees, Riggins, Ida., area	One section cut 7/25/40 and brought to Coeur d'Alene, Ida.	One section in Cage #5, 7/26/40.	
	Five sections cut 9/4/40 and brought to Coeur d'Alene, Ida.	Two sections placed in G.I. Can #2, 9/5/40. Three sections placed in G.I. Can #3, 9/5/40	
1941 Green standing trees, Riggins, Ida., area	Tree felled and left intact on ground 5/16/40. Two sections cut from this tree 5/2/41 and brought to Coeur d'Alene, Ida.	Two sections placed in G.I. Can #7, 5/3/41.	Emergence record of material overwintered 1940-41 and of that collected in 1941
Standing inf. tree, Shoup, Ida.	One section cut 2/17/41. Brought to Coeur d'Alene, Ida.	One section placed in G.I. Can #1, 2/19/41.	
Standing inf. trees, Riggins, Ida., area	Six sections cut 5/2/41 and brought to Coeur d'Alene, Ida.	One section in suspended Cage #9, 5/3/41. " " " " " #10, 5/3/41. Three sections placed in G.I.Can #3, 5/3/41. One section placed in G.I. Can #6, 5/3/41.	
	Three sections cut 6/29/41 and brought to Coeur d'Alene, Ida.	Three sections placed in Cage #6, 6/30/41.	
		Four special outdoor cages designated as Ma, Mb, Mc, and Mf were constructed during the 1941 season to induce attacks by *M. californica* and *gentilis* on caged logs. Newly emerged *Melanophila* adults were liberated in the special cages, which were provided with freshly cut sections of green ponderosa pine. 32 *M. gentilis* were liberated in Cage Ma, 161 *M. californica* in Cage Mb, 53 *M. californica* in Cage Mc, and 47 *M. californica* in Cage Mf. An examination was made late in September and in October 1941 of some of the ponderosa pine sections placed in the special outdoor cages. Attacks and developing larvae of both species were found at that time; also a fungus mycelium (*Polyporus volvatus*) forming on the cambium layer of the sections examined. All of the sections from the outdoor cages were removed and placed in rearing cages in the insectary on October 10, 1941, for overwintering 1941-42.	

	Slash							Standing trees									Totals 145½ sq. ft. bark surface
	Cages				Cans			Cages				Cans					
11 sections slash 16 sections standing trees	1:	2:	3:	4:	5:	6:	7:	5:	6:	9:	10:	1:	2:	3:	5:	6:	
M. gentilis	62	2	53	0	20	54	21	8	0	0	0	6	0	2	5	4	237
M. californica	0	3	11	12	2	3	18	123	66	41	18	47	35	23	42	9	453

Emergence during June, July and August 1941

1942	No field work	An examination was made of the 1940-41 overwintered sections during September 1942. Additional evidence of attack was found at this time, but all larval development had been destroyed by a heavy mycelium mat of *Polyporus volvatus* over the cambium layer and through the outer bark, fruiting bodies occurring on the outer bark surface of some of the sections.

No emergence of *M. californica* or *gentilis* was secured from the sections overwintered 1941-42. The only emergence recorded was one adult *Pissodes schwarzi* Hopk. which emerged from a section of infested ponderosa pine from the Riggins, Ida., area. This section had been placed in Cage Ma to secure emergence of *Melanophila* adults.